

ABSTRACT OF THE DISCLOSURE

[0046] Disclosed herein are an apparatus and a method for separating molecules on the basis of size and or structure, and to a method of making the apparatus. Generally, the separation method includes passing a fluid comprising particles having different effective molecular diameters through a plurality of open, nanoscale channels disposed in surfaces of substrates. The method also includes obtaining a plurality of fractions of the passed fluid such that each of the fractions includes a major portion containing particles having similar size and shape and substantially free of particles having larger size and shape. The apparatus includes first and second substrates each of which has a surface containing a plurality of open, nanoscale channels disposed therein. The surfaces are bonded together such that each of the channels of the first substrate is in fluid communication with at least two of the channels of the second substrate and is misaligned relative to the channels of the second substrate. Interferometric lithography and anodic bonding or flip-chip bonding techniques can be used to make the apparatus.